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Neoplasia in the Cat*

BY

E. COTCHIN

Department of Pathology, Royal Veterinary College, London

WHEN your secretary asked me to come to talk to you, he diplomatically left the choice of subject to me. You may think, at first sight, that the one I have chosen is not of very much immediate practical importance—and I would agree with you—but, nevertheless, I believe you will find it an interesting one, partly because cancer in cats is not an unknown occurrence in clinical practice, and partly because some interesting general aspects of cancer are well illustrated in this particular species.

I should like to begin by explaining what we mean by the terms " neoplasia " or " tumour formation ": broadly speaking, we mean a new growth of tissue, of that particular kind which in its malignant form is called " cancer ". While it is usually quite a straightforward matter, both in practice and in theory, to separate the typical cancer from the typical non-neoplastic lesion, it is not always easy: in the cat, for example, we often find great difficulty in deciding, even after histological examination, whether a lesion of the ceruminous glands of the lining of the external ear canal is truly neoplastic, or is merely an inflammatory one. However, it is valuable to define the limits of our subject, and to construct a definition that will as far as possible include the essential features of neoplastic growth.

The following definition, which is a shortened version of that given by Willis (1953), seems to be satisfactory: " A neoplasm is an abnormal mass of tissue, which shows excessive, persistent, and uncoordinated growth." There are two fundamental ideas underlying this concept of a neoplasm:—

(i) That the growth of the tumour cells is uncoordinated with that of the organism as a whole. It has somewhere been illuminatingly suggested that the tumour cells have, as it were, become " deaf " to the normal messages coming from the rest of the body.

(ii) That the growth is persistent, that is, that it continues independently of the presence of the cause of the neoplasia, so that, by this analogy of " deafness ", the cause of the cancer might be looked on as having the sort of relation to the continued growth of the tumour as the " cause " of his deafness would have to the failure of the deaf man to respond to commands.

A number of kinds of cause of cancer are already known, both for experimental and for spontaneous tumours: for some, the evidence is direct and incontrovertible, *e.g.* the relation of X-rays to skin cancer, while for others it is statistical, and for that reason thought to be more open to argument, *e.g.* the relation of heavy cigarette smoking to lung cancer. From a knowledge of these known causes, it is possible to make reasonable suggestions as to the possible causes of other cancers (as for one or two of the important tumours of cats which will be mentioned later). The important point at the moment is that the intrinsically significant thing about a cancer is not so much its cause as its special mode of growth.

This means that even if research fails to reveal the cause of many cancers, an insight into their special way of growth may allow this to be interfered with to the benefit of the patient. This would apply, for example, to cancers appearing to be under some hormonal influence in their growth (*cf.* human mammary cancer).

Studies on the origin of cancer have indicated that cancers arise from previously normal cells of the body, which have for some reason become converted into tumour cells. Thus, the idea of a sort of " spontaneous generation " of cancer can be abandoned, and it can be taken as axiomatic that " every cancer has a cause ". This is extended to the working hypo-

* Paper presented at a meeting of the Supplementary Veterinary Register Division of the B.V.A., January 3rd, 1957.

thesis that " similar cancers have similar causes ", and, conversely, that " dissimilar cancers have dissimilar causes ".

Now, although a neoplasm can theoretically develop from any cell in the body, some kinds of tumour are very much more common than others, and, in fact, in the cat, the striking thing is that there is such a restricted range of types. This would immediately suggest that a rather restricted range of causes of neoplasia is at work on the cat.

As is well known, neoplasms are classified according to their clinical features as being either benign or malignant. Benign tumours usually grow slowly, and by expansion, that is, they do not invade local tissue and are generally only harmful because of their position. Their two chief characteristics are (i) that they do not recur after removal, and (ii) that they never spread to form secondary tumours in other parts of the body—that is, they do not metastasise. Malignant tumours, on the other hand, usually grow quickly, often invade local tissue, and have as their two chief characteristics (i) that they may recur after removal, and (ii) more important still, that they may metastasise (they can of course cause considerable trouble even if they remain localised to their site of origin).

The clinical question as to whether or not a given tumour has metastasised may often be tentatively (and sometimes conclusively) answered by taking into account the two chief routes by which this spread of tumours may occur: (i) By way of the lymph stream. When tumours spread by this method, they usually lead to the growth of daughter tumours in the regional lymph node, so that enlargement of such a node is generally a bad sign, although it is not certain proof that metastasis has occurred. (ii) By way of the blood stream. The results of spread by this route may be more difficult to detect clinically. The two main sites for daughter growths are the lungs and the liver—the lungs for cancers developing in most parts of the body, except those in the portal drainage area, which will spread to the liver. Thus dyspnoea, or enlargement or other abnormality of the liver, would be bad signs. X-rays may be used to pick up lung secondaries.

In man, there are certain well-known examples of favoured sites of election for the growth of metastases from particular kinds of tumour, *e.g.* of prostatic cancer in the bones; but little is known of this aspect of cancer in animals. However, as we shall see, in cats, the kidneys may be a predilection site for certain malignant tumours arising in lymphatic tissue.

It has long been known that cancer occurs in all species of domestic animals, being more often seen in some (dog, cat, poultry) than in others (sheep, pig). Cancer in animals has the same general features as in man—it is generally of (as yet) unknown cause; it has similar pathological features; it has much the same fatal propensities (although in veterinary practice we are in the fortunate position of being able, if necessary, to provide a merciful early death); treatment is largely in the realm of surgery.

There are certain differences in the occurrence of cancer in animals and in man, which appear to be related to the following factors:—

(i) Age. Cancer in general is a disease of advancing age, and this is borne out by observations on the two species which tend normally to be allowed to live out most if not all of their " natural " span of life—the dog and the cat. The relative rarity of tumours in pigs and sheep is no doubt largely due to the early age at which most such animals are slaughtered, although it has been claimed, even allowing for this, that sheep at any rate are not prone to tumours.

(ii) Species. This is the most significant factor in determining what are the common tumours of our domestic species, and should be borne in mind throughout the following discussion of tumours in cats. Each species must be taken on its merits, and what holds for one species need not necessarily hold for another.

So far, we have been considering in rather general terms the important aspects of cancer as it occurs in any species, but we can now turn to the important aspects of cancer in the cat. My information is based on a survey of the 464 tumours from cats that have been examined in the Pathology Department of the Royal Veterinary College since the beginning of 1940. (For accounts of 426 of these tumours, see Cotchin, 1952, 1956a; for a review of the literature, see Lombard, 1940; Cotchin, 1956b.)

Incidence of Tumours in Cats

Not very much information is available as to the incidence of tumours in cats, and, because of the difficulties inherent in veterinary practice, it may not be very easily obtained. The few published surveys of tumours in cats have generally originated in large clinics, such as those attached to veterinary schools. My colleagues, Knight & Douglas (1943), concluded from a clinical survey at the Beaumont Animals' Hospital that the incidence of tumours (of all kinds) in cats was of the order of 1 per cent., which was only one fifth of the incidence they found in dogs. A similar estimate was made by Lasserre *et al.* (1938), from a survey of the neoplasms encountered at the veterinary school at Toulouse from 1933 to 1937, and Mayr (1931) considered that the incidence was 2 per cent. Estimates from clinical surveys of this kind are unfortunately deficient in two respects—there is no information of the size of the total cat population, and consequently there is no knowledge of what proportion the sick cats represent. However, this kind of survey could be extended into private practice, and if this were done in various parts of the country we might obtain much significant information on the geographical distribution of various types of cancer in cats, which would have, as will be shown later, relevance to the question of their causes.

During the period of this present survey of cat tumours, we have examined nearly six times as many tumours from dogs as from cats, but I think it can be said that the old idea that tumours are very rare in cats is incorrect.

Age Incidence

Just as we are ignorant of the total numbers of cats in this country, so we do not know what their normal life-span is. Comfort (1956) says that cats

FIG. 1

FIG. 2

FIG. 3

FIG. 4

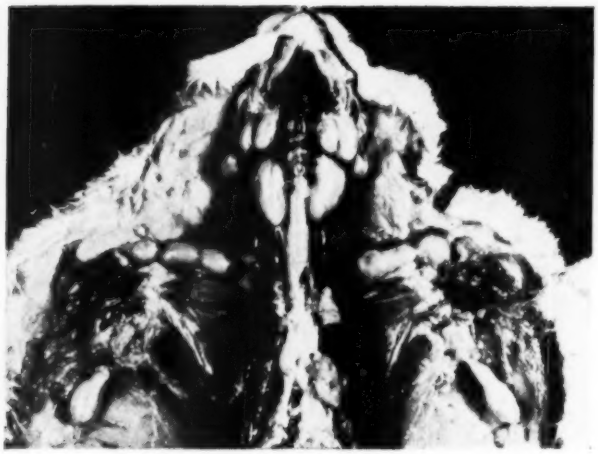

FIG. 5

FIG. 6

FIG. 8

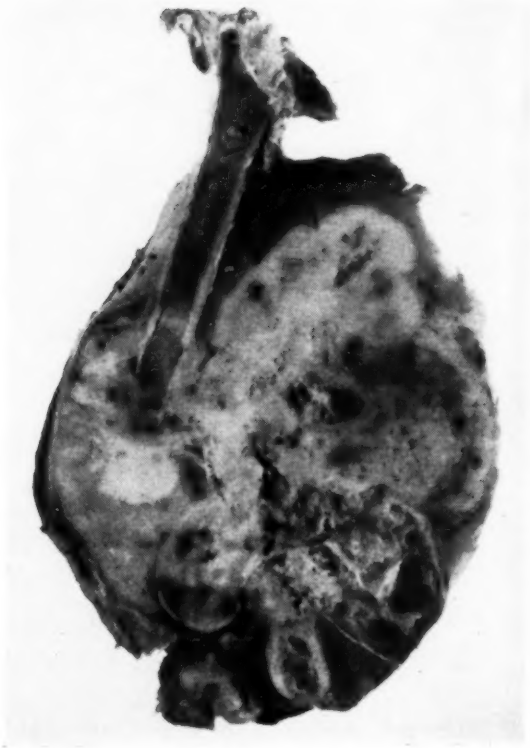

FIG. 7

FIG. 1.—Squamous-cell carcinoma, forming a firm, white projecting mass under the tongue of an aged neuter male cat, which had shown excessive salivation for three weeks. Metastasis was present in the right mandibular node.

FIG. 2.—Squamous-cell carcinoma, only slightly projecting, on the right ventro-lateral surface of the tongue at the level of the fraenum, in a 14-year-old neuter male cat. Deep invasion of the tongue was present, but no metastases were found.

FIG. 3.—Squamous-cell carcinoma of the cervical part of the oesophagus (an unusual site) of a seven-year-old neuter male cat. The cat had shown dysphagia, vomiting, and debility for some three weeks.

FIG. 4.—Lymphosarcoma of the anterior ventral mediastinum of a nine-month-old Siamese cat, forming a mass 10 cm. long and up to 7 cm. wide. The superior cervical, prescapular, and axillary nodes were also involved. The cat had shown increasing dyspnoea for about six weeks. Diagnosis was made by X-ray examination, followed by exploratory thoracotomy.

FIGS. 5 and 6.—Lymphatic leukosis (generalised lymphosarcoma) in a 12-year-old neuter male cat, showing the enlarged throat, neck, prescapular, and axillary nodes, and similar lesions in the intestine (arrowed), mesenteric and colonic nodes, and anterior mediastinum.

FIG. 7.—Chondrosarcoma of the right femur, with pathological fracture, of a five-year-old neuter male cat.

FIG. 8.—"Sarcoma kidneys" (lymphosarcoma) of a 10-year-old cat, showing multiple bilateral wedge-shaped cortical neoplastic foci.

are the longest-lived of the small domestic mammals. " Figures for cats in England in recent years included at least 10 apparently authentic cases over 20, and one gelt male alive at 28." Comfort points out that dogs very seldom exceed 18 years, and only exceptionally reach 20; he found remarkably few claims of greater longevity in the literature, referring to one of 34 years.

It would probably be agreed that cats of 20 years or more of age are exceptional; we have had few cats over 18 years old for *post-mortem* examination.

Here again is a suitable field for observations in clinical practice: a record of the ages of all cats examined over a period would be easy to keep, and would prove very interesting.

In man, cancer is, by and large, a disease of advancing age, and the same holds true for the cat. In the series of 464 tumours under consideration now, the distribution of tumours (both benign and malignant types) for each year of age, for those 377 cats of which we knew the age, was as shown in Table I.

TABLE I

SHOWING DISTRIBUTION OF 377 TUMOURS FROM CATS ACCORDING TO THE AGE OF THE AFFECTED ANIMAL

Age (years)	< 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	20+
Number of cats with tumours	2	6	7	10	19	14	25	26	36	47	43	39	30	16	19	15	10	9	2	0	1	1

There is seen to be a gradual increase in the numbers of tumours up to nine years of age, and then a gradual fall. To interpret this Table correctly, we should need to know the actual proportion of cats, of each year of age, which our tumour cases represent. No exact figures can be given, but the impression is that tumours actually continue to increase in frequency as cats grow older, so that the observed decline in actual numbers of affected animals may merely reflect decreasing total numbers of cats at these higher ages. We hoped we might get some idea of the relative numbers of cats of different ages by taking the ages of a series of 600 cats brought in to the Beaumont Animals' Hospital for clinical examination for any reason at all, with the rather surprising result shown in Table II.

TABLE II

SHOWING THE AGES OF 600 CATS EXAMINED IN THE COLLEGE CLINIC

Age (years)	< 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Number of cats	181	72	63	62	36	37	27	24	26	14	22	13	9	5	6	2	0	0	0	0	1

If this gives anything like the correct view of the age distribution of cats in the general population, it clearly supports the idea that the chances of a cat developing a tumour continue to increase with age.

The explanation of such an increasing incidence is not absolutely certain. It seems likely that it is largely related to the " latent period " cancer takes to develop after its initiation, so that as cats get older their chances increase of having been exposed for a sufficient length of time previously to possible tumour-producing agents. It is important to remember that the interval between actual initiation of the tumour and its clinically-observable development may be quite long, and that the cause may have ceased to act some time before the tumour actually appears. It seems unlikely that older cats are exposed to a more cancer-producing environment than are young cats, as they are living in much the same way, in much the same surroundings. Possibly the tissues of older animals are more susceptible.

Certain tumours appear to be more likely to develop in young animals: in the dog, for example, sarcomas of ribs are prone to occur in animals one and a half to four years of age, rather than in older dogs. In cats, the position is less clear, but there is a suggestion that malignant tumours of connective tissue (sarcomas) may predominate in younger animals. Thus, in our series, of the 44 tumour-bearing cats aged four years or less, 32 had malignant tumours, of which seven were of epithelial type (carcinomas), and 25 were sarcomas; of the eight cats aged one year or less, four actually had lymphosarcomas. At the other end of life, of the 38 tumour-bearing cats aged 15 or over, 30 had malignant tumours, but here the proportion of carcinomas (13) to sarcomas (17) was more nearly equal.

Sex Incidence

In this series of tumour-bearing animals, of the 356 cats whose sex we know, 253 were males, and 103 were females. Of the males, 212 were castrated, and of the females, 37 were castrated. In the series of 600 " clinic " cats, 475 were males (290 castrated) and 125 females (52 castrated). Table III compares these two groups, expressing the numbers as percentages of the total numbers of cats concerned (356 and 600 respectively).

TABLE III

SHOWING SEX DISTRIBUTION OF 356 CATS WITH TUMOURS, COMPARED WITH SEX DISTRIBUTION OF 600 " CLINIC " CATS

	Males	Percentages of Castrated males	Females	Castrated females
Tumour-bearing cats ...	71	60	29	10
" Clinic " cats	79	48	21	9

Thus, the proportion of males to females in the tumour-bearing cats is about 7:3, while in the " clinic " cats it is about 8:2. The apparent preponderance of entire males in the " clinic " series, as compared with the tumour series, almost certainly reflects the fact that proportionately more of the clinic cases were very young.

Systems of Origin

The systems of origin of the 464 tumours from cats that we have examined at the Royal Veterinary College since 1940 were as shown in Table IV.

TABLE IV

SHOWING SYSTEMS OF ORIGIN OF 464 TUMOURS FROM CATS

System	Number of tumours	Percentage of total
Alimentary	133	28.7
Cutaneous	116	25.0
Genital	55	11.9
Lymphatic	50	10.8
Skeletal	40	8.6
Urinary	23	5.0
Respiratory	10	2.2
Endocrine	4	0.9
Eye	3	0.6
Miscellaneous and unknown	30	6.5
	464	100.2

This distribution shows certain interesting differences from that previously reported for neoplasms in dogs (Cotchin, 1954), where the cutaneous tumours led the list, being followed by the genital system, the alimentary system coming third only. The cat, in contrast with the dog, shows fewer skin tumours, and also fewer mammary gland tumours—these are of course very common in bitches. As in the dog, primary tumours of the respiratory system are uncommon in cats, and tumours of the central nervous system are rarely reported.

Malignant Tumours

Chief interest attaches, of course, to the malignant tumours. Leaving on one side the miscellaneous tumours of uncertain type of origin, it was found that of the 434 tumours whose system of origin was known, 328 (75.6 per cent.) were histologically malignant. Of these, 179 (55 per cent. of the malignant tumours, or 41 per cent. of the total number of tumours) were sarcomas, and 149 (45 per cent. of the malignant tumours, or 34 per cent. of the total number) were carcinomas. These figures can be expressed more simply by saying that three out of four of the tumours in this series were malignant, and of these, rather more than half were sarcomas and rather fewer than half were carcinomas.

The origin of these malignant tumours is given in Table V.

TABLE V

SHOWING SYSTEM DISTRIBUTION OF 328 MALIGNANT TUMOURS IN CATS

System	Number of carcinomas	Number of sarcomas	Total
Alimentary	81	41	122
Cutaneous	19	29	48
Genital	40	2	42
Lymphatic	—	47	47
Skeletal	—	38	38
Urinary	1	19	20
Respiratory	5	3	8
Eye	2	0	2
Endocrine	1	0	1
	149	179	328

Some points of interest arise in respect of the malignant tumours of the various systems, which are now dealt with in turn.

1. Alimentary System

The sites of origin of the 122 malignant tumours in this system are shown in Table VI.

TABLE VI

SHOWING THE SITES OF ORIGIN OF 122 MALIGNANT TUMOURS OF THE ALIMENTARY SYSTEM IN CATS, AND THEIR TYPE

Site of origin	Number of carcinomas	Number of sarcomas
Tongue	18	1
Tonsil	11	1
Gum, palate, pharynx	15	5
Oesophagus	19	1
Stomach	0	2
Intestine	8	31
Liver	2	0
Pancreas	8	0
	81	41

From the Table, it will be seen that the two important kinds of malignant tumour in the alimentary system in this series were (a) carcinoma of the upper part of the alimentary tract and (b) sarcoma of the intestine. The 63 specimens of carcinoma from the upper part of the alimentary tract (mouth, pharynx, and oesophagus) were, with one exception, squamous-cell carcinomas, that is, malignant tumours derived from the surface epithelium. Noteworthy in this series is the absence of carcinoma of the stomach and of the large intestine, and the rarity of liver tumours. In the cat, carcinoma of the tonsil is relatively less common than in the dog, but cancer of the tongue and oesophagus, which are very rare in the dog, are comparatively common in cats.

(i) *Squamous-cell carcinoma of the upper alimentary tract*

The age incidence of these tumours, as shown in Table VII, shows one point of interest.

TABLE VII

SHOWING THE AGE DISTRIBUTION OF 50 SQUAMOUS-CELL CARCINOMAS OF THE UPPER ALIMENTARY TRACT OF CATS

Age (years)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Number of affected cats	0	0	1	4	1	0	4	4	11	8	4	1	1	6	3	1	1	0	0	0

Although it would be wrong to attempt to draw any conclusion from these few cases—the ages of only 50 of the affected cats were recorded—if these figures do at all closely reflect the true situation, they might suggest that there may be two late peaks in the age incidence (as at 9 or 10 years, and again at 14 years). The point is an interesting one and needs confirmation, for it might suggest that two distinct kinds of aetiological agent could be at work (with different latent periods, or acting at different times) in producing these alimentary tumours. Incidentally,

it was noted that in one period, 13 out of 226 tumours from cats were squamous-cell carcinomas of the oesophagus, while in the next period, only 5 out of 200 were of this kind. Whether this indicates a falling-off in the actual incidence of oesophageal cancer in cats remains to be seen.

The sex incidence of these squamous-cell carcinomas was strongly in favour of males (9:1): of 52 cats for which the sex was recorded, 47 were males (40 being castrated) and only five were females (two being castrated).

The chief characters of these squamous-cell carcinomas at their different sites of origin can be briefly described:—

Tongue (17 squamous-cell carcinomas). The tumours developed on the ventro-lateral surface of the tongue, somewhere about the level of the reflection of the web, and appeared as firm, yellowish or whitish nodular masses (Fig. 1) which, although often only protruding to a moderate extent (Fig. 2), tended to invade the tongue muscle very deeply. In one case, for example, the carcinoma penetrated the body of the tongue as far as the dorsal surface. Spread to the local lymph node does not seem to occur very early in the clinical course of the disease (the symptoms were of salivation and of difficulty in swallowing), but was present (in the mandibular node) in two of our cases.

In this series of cases, while the particular side of the ventral part of the tongue that was originally affected could not always be determined, the left side seemed to be the more usual. A further point of interest is that, on two or three occasions, ulcerating lesions in a similar position, which were strongly suspected clinically of being carcinomas, have turned out to be in fact merely inflammatory. It seems possible that the ventro-lateral surface of the tongue may be found to be a site of election not only for cancer, but also for chronic inflammations.

Tonsil (11 squamous-cell carcinomas). Records are incomplete, but six of the carcinomas affected the left tonsil, and three the right: here again, a possible preponderance of left-side lesions is indicated. The tumours were keratinising squamous-cell carcinomas, which formed nodular, firm, whitish masses, leading to difficulty in swallowing. These tumours appear to be very prone to metastasise to the regional (superior cervical) lymph node (much less commonly involving the mandibular node), such spread being present in at least 8 of our 11 cases. This frequency of involvement of the local node quite early in the clinical course of the disease parallels the similar marked tendency shown by carcinoma of the tonsil in the dog, and is a point of difference from the tongue carcinoma.

Gum, palate, and pharynx (15 squamous-cell carcinomas). In five cases the upper gum was involved, in three, the lower. The lesions formed firm, whitish, variably ulcerated and infected masses, which in the case of the gum tumours often simulated bone sarcomas. Four of these tumours had spread —in three cats, to the regional superior cervical lymph node, and in a fourth, to the lung and elsewhere.

Oesophagus (19 squamous-cell carcinomas). The common site of origin of these carcinomas was at about the level of the entrance to the chest, in front of the aortic arch. (In three cats, however, the point of origin was in the cervical part of the oesophagus—in two, the upper part of the cervical oesophagus, in one, rather diffusely over the greater part of this region.) The site of origin of these oesophageal cancers was thus much more restricted than it is in man, but even so, the middle third of the oesophagus seems to be the most common site in humans.

The lesions formed whitish growth of tissue, almost encircling the oesophagus, with an irregular surface, and usually extending over 1 or more cm. along the mucous membrane (Fig. 3). In one cat, erosion into the wall of the trachea locally had occurred, and in two others, metastatic deposits were present in the regional mediastinal lymph nodes. In most cases, however, the symptoms—of increasing oesophageal obstruction, regurgitation occurring more or less immediately after swallowing solid food—draw attention to the presence of the lesion before metastasis has had time to occur.

The remaining malignant tumours of the upper alimentary tract can be briefly listed: an adenocarcinoma (? from salivary gland duct) of the root of the tongue; lymphosarcomas of the tongue, tonsil, and oesophagus respectively, and, in three cats, fibrosarcoma of the gum.

(ii) *Sarcoma of the intestine*

These 31 tumours were of a variable nature, but at least 18 of them were lymphosarcomas and presumably originated in the lymphoid tissue of the wall of the intestine. Of the affected cats, 18 were known to be male (15 castrated) and five female (two castrated). All but one of the sarcomas affected the small intestine, although two also involved in part the large intestine. The usual site of origin was the jejunum, or, particularly, the ileum at its terminal part, but at least three involved the duodenum. In at least two cases, multiple tumours were present in the bowel. There was quite a high tendency to spread to the regional nodes (mesenteric or ileocolic) and elsewhere: thus, metastases were present in 18 cats, involving regional nodes (11), liver (12), kidneys (eight), spleen (four), lungs (three), and other organs (five cats).

The main symptom was of developing intestinal obstruction, and an abdominal mass became palpable (this might be the tumour itself, or the affected regional nodes, or the affected kidneys). The tumours appeared as greyish-white regional thickenings of the bowel wall, of varying extent, and of variable, usually moderately soft, consistency, and a fairly homogeneous cut surface. The tumours involved the muscular coat as well as the mucous membrane, but there was less tendency to diverticulum formation than is seen with the corresponding tumour in dogs.

The other malignant tumours of the lower part of the alimentary system were as follows:—

Stomach. There were two examples of sarcoma (one being a lymphosarcoma). Both occurred, as it happened, in nine-year-old castrated male cats, and both formed whitish, rather diffuse thickenings of the stomach wall. Both metastasised—one to the regional node, the other to the omentum and diaphragm. No case of carcinoma of the stomach was seen.

Intestine. There were eight cases of adenocarcinoma of the small intestine, which produced symptoms of increasing intestinal obstruction, loss of weight, and the formation of a palpable, abdominal mass. Two of the tumours affected the duodenum, the others the jejunum or ileum. Five metastasised, to regional nodes or elsewhere. One of the tumours, in the ileum of a nine-year-old castrated female, was removed operatively, so far as is known successfully.

No carcinoma of the large intestine was seen. (Rubarth (1934) has described a caecal carcinoma in a cat.) Taylor & Kater (1954), who reported two cases of adenocarcinoma of the ileum in cats, pointed out that the lesions macroscopically were suggestive of chronic inflammatory changes, and they indicate the need for histological examination of such lesions to reveal their neoplastic nature.

Liver. There were only two malignant tumours. One, a mucoid carcinoma of the bile-duct of a nine-year-old castrated male, formed a firm, greyish-white, irregular mass, extending on to the wall of the stomach and the posterior surface of the diaphragm, and giving rise to secondary tumours in the lungs. The other was a liver-cell carcinoma, with metastases in the omentum and the lungs.

Pancreas. There were eight cases of adenocarcinoma of the pancreas, which were derived from the exocrine portion of the gland. Six occurred in castrated males, two in entire females. The tumours were associated with loss of condition, loss of appetite, and occasional vomiting. They formed greyish-white, firm, irregular masses, which tended to spread to the liver (this had occurred in five of the eight cats).

2. Cutaneous System

The information available about the post-operative histories of the cats from which the skin tumours in this series came is very incomplete, and for that reason I have omitted from the list of "carcinomas" all the examples of "basal-cell carcinomas" (see Baumgärtner, 1933), which do not seem to be at any rate highly malignant. The malignant tumours I have included consisted of 19 carcinomas (six squamous-cell carcinomas of the body skin, six squamous-cell carcinomas of the ear flaps, and seven adenocarcinomas of the ceruminous glands of the external auditory canal), and 29 sarcomas (28 of the skin proper, and an angiosarcoma of the skin of the ear flap).

Notable in this series, as compared with skin tumours of dogs, is the absence of malignant melanomas. Circumanal adenomas, so often seen in old male dogs, cannot of course occur in cats, as the glands of origin are present only in the dog.

In the cat (as in the dog) squamous-cell carcinoma of the skin is not very common. Half of the 12 examples arose from the ear flaps. These appeared to arise particularly from the integument of the outer surface. One of the tumours, in a seven-year-old castrated male cat, showed extensive local invasion of parotid lymph and salivary glands. No information is available about the clinical malignancy of the six carcinomas of the general body surface.

The most interesting carcinoma of this system is the ceruminous adenocarcinoma, which is rare in species other than the cat (including man). As already stated, it is sometimes difficult to distinguish hyperplastic from neoplastic lesions of these ceruminous glands, but at least one of the adenocarcinomas (in a nine-year-old castrated male cat) had metastasised; at *post-mortem* examination, the primary lesion, in the right ear canal, was found to have spread to the right superior cervical and prescapular, the left mandibular, superior cervical and prescapular, the bronchial and the mediastinal lymph nodes, and to the kidneys.

The 29 sarcomas of the skin formed a very heterogeneous group, and insufficient information is available to allow proper assessment of their clinical malignancy. The tumours were composed of rounded or of spindle-shaped cells; in 12 cases, they were classed as fibrosarcomas.

3. Genital System

The great majority of tumours of the genital system of cats occur in the mammary gland of the entire female. We saw no examples of testis, prostate, or other tumour of the male genital system, and no carcinomas of the uterus or cervix (although Meier (1956a) reported an adenocarcinoma of endometrial glands, and a squamous-cell carcinoma associated with pyometra). In our series of 42 malignant tumours, there was one example of lymphosarcoma of the uterus, one of spindle-cell sarcoma of the mamma, and one of adenocarcinoma of an ovary.

As compared with the dog, the striking feature of mammary tumours in the cat is that the great majority of them are malignant histologically, and to a somewhat lesser extent clinically (38 adenocarcinomas, as against six adenomas). The peak incidence of mammary adenocarcinoma occurred at 12 years of age, that is, rather later than the main peak incidence of alimentary carcinoma, as shown in Table VIII.

TABLE VIII

SHOWING AGE INCIDENCE OF 34 ADENOCARCINOMAS OF THE MAMMARY GLANDS OF CATS

Age, (years)	1	2	3	4	5	6	7	8	9	10	11
	12	13	14	15	16	17	18	19	20		
Number of carcinomas	0	0	0	0	0	2	0	1	4	5	5
	10	1	4	0	2	0	0	0	0		

One of the mammary carcinomas was recorded as occurring in a castrated male cat, although this is not quite certain: Thiéry (1946) has also reported a glandular carcinoma in the region of the mammary gland of a castrated male cat. Of the other affected cats, six were castrated females (although at least one of these had been castrated late in life). Information as to which particular mammary gland was involved was not always given, but of the 20 whose position was noted, 14 were in the anterior gland, two in abdominal glands, and only four in the posterior glands.

The tumours were generally rather firm, ulcerated, irregular flat masses, adherent to the skin, with variable invasion of the local muscles, and sometimes of the local chest wall. Metastasis was definitely present in 11 of the affected cats—in the regional node (nine cats), the lungs (eight) and elsewhere.

Nielsen (1952), who gives an excellent account of mammary carcinomas in cats, has studied the lymphatic drainage of the mammary glands. He found there were usually four mammae on either side. The two anterior glands on either side had lymphatic connexions, and drained into the axillary node. The two posterior glands also had interglandular anastomosing lymph vessels, and drained to the corresponding inguinal lymph nodes. Lymphatic vessels did not cross the mid-line, nor did they penetrate the abdominal wall. In respect to treatment, Nielsen mentions that two cats spayed simultaneously with operative removal of the carcinoma showed recurrence 6 to 21 months later respectively.

4. Lymphatic System and Spleen

Tumours of the lymphatic system are of importance in the cat. The main lesions in our series affected the mesenteric node (25), spleen (five), or the anterior mediastinum (seven), or were generalised in the form of lymphatic leukosis (10 cats), corresponding to the so-called pseudo-Hodgkin's disease of the dog.

(a) *Mesenteric node (25 sarcomas)*

Of the 25 sarcomas, 14 showed a tendency, more or less marked, to be composed of spindle-shaped cells, and it is possible that some of them were of smooth muscle (leiomyosarcoma) or blood vessel (angiosarcoma) origin. Of the others, six (and probably eight) were lymphosarcomas, and three were reticulosarcomas. Sixteen of the affected animals were known to be male (14 castrated), and three female (two castrated). The lesions occurred in cats between the ages of 6 and 14 years, and caused symptoms of loss of weight, and the development of a palpable mass in the abdomen.

The tumours were often quite large, and were of an irregularly oval shape, rather soft, and greyish-white on the cut surface. There was variable and sometimes extensive haemorrhage, particularly in the angiosarcomas. These tumours were quite prone to metastasise, secondaries being found in 13 cats (liver nine, lung three, spleen three, anterior mediastinum one). Their peak incidence was at 11 years of age, compared with nine years for the intestinal lymphosarcomas, and the question arises whether these tumours, in some cases at least, did not represent metastases of undetected primary lesions of the intestinal wall.

(b) *Spleen*

There were five cases in which the spleen was diffusely enlarged by a neoplastic proliferation of reticulum cells. The symptoms were of loss of appetite and abdominal distension—the spleen might be very much enlarged, reaching a length of 20 cm., and a weight of 355 g. The nature of these lesions is uncertain: three of the spleens were removed operatively, apparently with success, but in at least one of the other cats metastasis was present (involving the liver and myocardium).

(c) *Anterior mediastinum (7 lymphosarcomas)*

Lymphosarcomas developed in the anterior mediastinum of seven cats, being responsible for difficulty in breathing (Fig. 4). Two of the affected animals were under one year of age (eight months and nine months old respectively), three were six years of age, and one was 17. It seems possible that the tumours in the young cats may have originated in the thymus gland (see Locke, 1948).

These tumours were greyish-white, irregularly pyramidal masses, usually with smooth but nodular surfaces, although one had invaded the root of the lung locally. Small calcified areas were present in two of the tumours.

(d) *Generalised lymphosarcoma (10 cases)*

There were 10 examples of generalised lymphosarcoma of lymphatic leukosis type, characterised by a widespread and more or less bilaterally symmetrical enlargement of the body nodes (Figs. 5 and 6), and sometimes involving other organs (including the liver) or forming prominent masses in the anterior mediastinum (see Pallaske, 1955).

The papers by Nielsen & Holzworth (Nielsen & Holzworth, 1953; Holzworth & Nielsen, 1955) are very helpful in connexion with these sarcomas of the lymphatic system, and will be referred to later.

5. Skeletal System

There were 38 malignant tumours (sarcomas) of bones, which affected the humerus (14 cats), femur (10), head bones, chiefly the jaws (seven), pelvis (three), scapula (two), radius (one), and a vertebral body (one). Fifteen of the affected cats were known to be male (14 castrated) and five female (four castrated). There was no particular age incidence, the tumours occurring at widely scattered ages, as shown in Table IX.

TABLE IX

SHOWING THE AGE INCIDENCE OF 26 BONE SARCOMAS IN CATS

Age (years)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Number of sarcomas	0	2	0	2	2	0	0	3	3	0	3	1	1	3	2	1	1	1	0	1

The tumours (Fig. 7) formed large, white, firm, fibrous masses, with variable areas resembling cartilage or bone (although one humerus sarcoma was very soft and vascular). Metastases were present in six cats, affected with sarcoma of the humerus (three cats) femur (two) and radius (one) respectively, involving the lungs in five cases and the regional nodes in two.

6. Urinary System

Nineteen of the 20 malignant tumours of this system affected the kidneys, the remaining tumour being a possible carcinoma of the urinary bladder of a 13-year-old castrated male cat, appearing as a diffuse thickening of half the bladder wall.

Of the 19 sarcomas, 13 and perhaps 15 were lymphosarcomas, the others being spindle-cell sarcomas. Nearly all the lesions were bilateral and multiple, which suggests that these kidney lesions, although being the predominant ones clinically as well as at *post-mortem* examination, were in fact secondary deposits from some other primary site: the intestine suggests itself, in view of the presence of kidney metastases in quite a number of cases of what were clearly primary sarcomas of the intestine. Eight of the affected cats were male (six castrated) and four female (two castrated). The ages ranged from 2 to 17 years, although 10 of 14 cats were eight years of age or less. The symptoms included thirst, inappetence, loss of weight, and the development of palpably enlarged kidneys.

The lesions (Fig. 8) were of the kind which has been called " sarcoma kidney ", or sometimes " large white kidney ". The cortex showed focal or more diffuse bulging swellings, often wedge-shaped, of whitish or yellowish-white, rather soft, homogeneous masses of tissue. Some of the affected kidneys were notably large. In at least seven of the cats, similar sarcomatous tissue was present elsewhere—in mesenteric node, intestine, liver, myocardium, lung, and anterior mediastinum—but the kidney lesions were much the most prominent.

7. Other Systems

The remaining malignant tumours comprised:—

Respiratory system: two carcinomas and two sarcomas of the nasal cavities, one lymphosarcoma of the larynx, and three possible primary mucoid bronchial adenocarcinomas of the lungs.

Eye: two malignant epithelial tumours in the eye (an anaplastic carcinoma in the ciliary body; an anaplastic epithelial tumour filling most of the eye), both in seven-year-old castrated male cats.

Endocrine system: a thyroid carcinoma, forming a well-defined brownish friable mass in the position of the right thyroid gland of a 13-year-old castrated male cat.

Discussion

From this survey, a picture emerges of cancer in the cat which must appear very surprising to one familiar only with cancer in man. We see, for example, that sarcomas were more often encountered than carcinomas, whereas in man, sarcomas constitute only 5 to 10 per cent. of all growths in white-skinned people (Hieger, 1955, p. 57). This higher proportion of sarcomas, in relation to carcinomas, is also seen in the dog.

What is still more striking is that, although carcinomas were common in the upper alimentary tract and in the mammary gland in our cats, there were no instances of carcinoma of the stomach, or of the uterus, and only three possible primary carcinomas of the lung, whereas these are of course very important sites of cancer in humans. Thus, it was noted in 1954 (Anon, 1954) that " in recent years, the breast has accounted for 20 per cent. of all deaths due to malignant disease, and the uterus for 12 per cent. or less until latterly ". Again, Hieger (1955, p. 27) noted that the stomach was responsible for 25 per cent. of all cancer deaths in England and Wales. In man, of course, very considerable concern is felt over the remarkable increase in the incidence of cancer of the lung. McKenzie (1956) noted that, during the past 30 years, the deaths assigned to carcinoma of the lung and bronchus in this country had increased from a yearly average, between 1916 and 1920, of 428, to a total of 16,331 in 1954.

These differences in incidence, however, should be looked on as a special feature of cancer in man rather than of cancer in the cat, for, in all our domestic mammals, the glandular stomach, the uterus (except perhaps in cattle—Monlux *et al.*, 1956), and the lung are very uncommon sites of primary cancer (although recently ten Thije & Ressang (1956) have suggested that there is some indication of a recent increase in the incidence of lung cancer in dogs).

The most striking relation between man and the cat as regards the site of origin of important cancers is in regard to the oesophagus, for the cat is the only domestic animal in which this organ is affected at all frequently.

Another striking feature of cancer in the cat is how closely it resembles, and yet how it differs from, cancer in the dog, as is indicated by Table X, which shows the important sites of origin of malignant tumours in the two species.

TABLE X

SHOWING THE IMPORTANT MALIGNANT TUMOURS OF THE CAT AND THE DOG

Tumour	Cat	Dog
Squamous-cell carcinoma of upper alimentary tract	+	+
Lymphosarcoma	+	+
Mammary gland malignancy	+	+
Bone sarcoma	+	+
Malignant melanoma	o	+

In both the cat and dog, the important malignant tumours that occur are: squamous-cell carcinomas of the upper alimentary tract, lymphosarcoma, malignant tumours of the mammary gland, and sarcomas of bone. Malignant melanomas are important in the dog (Cotchin, 1955) but rare in cats.

However, when we look at these various kinds of cancer that are important in and common to both species, we find certain interesting differences.

(i) *Squamous-cell carcinoma of the upper alimentary tract.* In the dog, this type of tumour is practically confined to the tonsil, which is in fact a very important primary site of cancer in dogs in this region of the country. In the cat, the sites of origin are more widespread, but the tumours show certain rather marked tendencies to occur in particular sites, such as the ventrolateral part of the tongue, the tonsil, and the mid-oesophagus. However, it seems very possible that the lesions in the two species are analagous, and may be due to the same sort of cause.

(ii) *Lymphosarcomas* form a very important group of tumours in the cat, as they do in other domestic animals. Although, as has been shown, the lesions may predominate in one or other of the main sites—the intestine, its associated nodes, the anterior mediastinum, the lymph nodes generally, or the kidneys—allowing for the classification of the lymphosarcomas accordingly, it seems very possible that these are all merely different manifestations of one single type of neoplasm. In the cat, the generalised form is relatively less often seen than in the dog and the frequent involvement of the kidneys is a striking feature in cats.

When considering the differential diagnosis of lymphosarcoma in cats, the practitioner could very profitably consult the articles by Nielsen & Holzworth (1953) and Holzworth & Nielsen (1955), which are particularly well illustrated. The authors point out that the clinical course of conditions associated with lymphosarcomas in cats seems to be very short when one considers the size and extent of tumour development that may be present. In the case of lymphosarcoma of the anterior mediastinum, for example, they refer to the cat's ability to adjust itself to the presence of the concomitant oedematous fluid in the thorax, so that symptoms of laboured abdominal breathing may not appear until late in the clinical course of the disease. They point out, too, the value of X-ray examination, *e.g.* of the thorax in diagnosis of mediastinal lymphosarcomas, and also the possible value of a blood examination: in one cat, for example, although the white-cell count was only moderately raised, 94 per cent. of the cells were lymphocytes, many of them immature. An interesting reference is also made to the successful operative removal, with intestinal anastomosis, of a lymphosarcoma of the ileocolic junction and caecum of a cat, in which there was no associated mesenteric node involvement.

(iii) *Malignant tumours of the mammary gland.* In the cat, the predominant tumour is an adenocarcinoma, whereas in the bitch there is a wider variety of malignant tumours, including, besides adenocarcinomas, sarcomas such as osteosarcomas, and complex malignant tumours. These tumours in the bitch are the malignant counterpart of the various kinds of benign mixed tumours that so commonly occur, and tumours of this latter kind are very rare in the cat, if they occur at all. It seems probable that much of the neoplastic growth seen in the mammary gland of the bitch involves a particular kind of cell—the myoepithelium—which plays a much less prominent part in neoplasia in the cat's mamma. The causes of mammary malignancy in cats are thus likely to differ somewhat from those in bitches.

(iv) *Sarcomas of bone.* In the dog, the sites of origin of bone sarcomas are more localised than they seem to be in the cat. In the dog (Cotchin, 1953) the majority of bone sarcomas affect the long limb bones or the ribs, the favoured sites being the upper end of the humerus, the lower end of the radius, femur, or tibia, and the middle-numbered ribs at about the costo-chondral junction. In the cat, the two commonest bone tumours affect the humerus and the femur. However, the dog and the cat are the only two species of domestic mammal to show any significant incidence of limb-bone osteo-sarcomas, and in both the humerus is the commonest site.

The one important malignant tumour of the dog that appears to be rare in cats is the malignant melanoma. As regards other tumours, we may note that while testis tumours occur commonly in the dog, they must be very rare in cats. Meier (1956b) has reported finding Sertoli-cell tumours in two cats (there were no feminising symptoms, as often occur in similar cases in the dog). Conversely, malignant tumours of the glands of the external auditory canal are of some importance in cats, but must be rare in dogs.

The clinical significance of malignant tumours in cats has been referred to in connexion with each important type. They must clearly be considered in the differential diagnosis when an animal loses weight, or shows signs of obstruction of the alimentary canal, or develops a palpable mass in the abdomen. In general, the prognosis is not favourable for operative or other treatment, so that confirmation of the diagnosis is important.

The chief interest of these malignant tumours, after their clinical significance, lies in trying to suggest a reason for their occurrence. For example, the only likely explanation for the occurrence of the tumours of the upper alimentary system would seem to be that they are due to the cat ingesting some carcinogenic substance, either in food, or in drink, or swallowed for some other reason. It has been suggested to me that cats may be ingesting a carcinogenic agent, which has contaminated their fur from the atmosphere, during the process of licking their coats and swallowing fur. If this latter suggestion is correct, we should expect to find a marked difference in the incidence of upper alimentary tract carcinomas in cats living in cities, such as London, and in remote rural areas, whereas if the food or drink (? fish, ? milk) were concerned, the incidence might be more or less the same. It should be possible to collect information on the incidence of these carcinomas in different parts of the country, as the lesions are capable of definite diagnosis. Further, it might not be too fanciful to try and see whether, apart from any possible geographical variation in the incidence, there was any observable connexion with the " social class " of the owner: it is noted that the Registrar-General's report for 1930-32 showed that cancer of

the mouth, pharynx, oesophagus, and stomach was about half as common in the well-to-do as in the poorer classes (Hieger, 1955, p. 26).

Carcinoma of the mammary gland in our series had a striking peak incidence in cats 12 years of age. What we need to know is something about the breeding histories of affected cats—in women, whereas uterine cancer is facilitated by pregnancies, cancer of the breast is facilitated by barrenness (Hieger, 1955, p. 27). Again, it would be of interest to know at what age the majority of cats stop breeding.

The common occurrence of sarcomas of the intestine or of the mesenteric lymph nodes in cats would seem to be compatible with their cause being either some ingested carcinogenic substance, which would bring these tumours into line with the carcinomas of the upper alimentary tract, or to an ingested virus. A colleague of mine is investigating the blood picture in cases of lymphosarcoma in cats, and we should be particularly interested to examine cases of generalised lymphosarcoma (lymphatic leukosis).

It is difficult to make any useful suggestion as to the likely cause of sarcomas of bone in cats. In the dog, they are most often seen in large dogs when they affect the limb bones, and this raises the possibility that they may be related to trauma (as from the heavy bodyweight), or to growth disturbances due to inadequate diet, or even to some hereditary effect. Not enough is known about bone tumours in cats to say whether trauma, for example, might be a significant precursor of bone sarcoma, but an enquiry into the history of affected animals might bring useful information to light.

Summary

An account is given of 464 tumours from cats, with particular reference to 328 malignant tumours whose origin was known. Of these, 179 were sarcomas, and 149 carcinomas. The important malignant tumours were: squamous-cell carcinoma of the upper alimentary tract (62 cases), sarcoma of the intestine (31), adenocarcinoma of the mammary gland (38), malignant tumours of the lymphatic system and spleen (mesenteric node 25, spleen five, anterior mediastinum seven, and lymphatic leukosis 10), and sarcomas of bones (38) and kidneys (19).

Comparisons and contrasts are made with the important malignant tumours of man and of dogs, and some speculations on the causes of malignant tumours in cats are indulged in.

Acknowledgments.—I should like to thank all those who have so kindly helped by providing material and in other ways.

Fig. 1 is reproduced from *Brit. J. Radiol* (1956), **29**, 311-6, by kind permission of the Hon. Editors.

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LOOKING AT BIRDS

This is "bird fortnight" at Kodak Hall, Kingsway, London, where an exhibition of 125 bird photographs by Eric Hosking, F.R.P.S., M.B.O.U., is being held. The Royal Society for the Protection of Birds, the British Trust for Ornithology, and the Wildfowl Trust, are presenting the exhibition. In their view, photography has just as important a part to play in ornithology as in any other scientific research. Apart from arousing public interest in birds, photographs can help in the study of bird behaviour, recording the terrain and distribution of birds, estimating bird population, and identifying insect food photographed in birds' bills.

This exhibition ranges over the British Isles, Holland, and Spain, and includes both the rare and the homely, the elegant and the bizarre. Especially notable are the photographs showing the nictitating eyelids in both parents and young of certain birds to protect the eyes during the rough-and-tumble of feeding the young: 12 photographs showing a baby cuckoo, its whole body alive with evil determination, ousting the eggs from a tree pipit's nest, and a lovely photograph of a newly-hatched stone curlew, toddling trustfully out of the nest to the protection of the waiting cock bird, leaving the hen to get on with the serious business of hatching the second egg.

A Method of Correcting the Displaced Bovine Abomasum

BY

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THE literature relating to the displacement of the bovine abomasum has been adequately reviewed recently by Wood (1957). It is not proposed, therefore, to preface this description of a method of replacement of the abomasum by going over the same ground. Similarly, Wood and otners have given an adequate description of clinical symptoms exhibited by animals with the condition, and it seems unnecessary, therefore, to relate in detail the symptoms exhibited by the four cows which underwent operation in the present series.

For the operation a left-flank incision was used, using first-second lumbar epidural anaesthesia (Arthur, 1956), and lignocaine hydrochloride* was used as the anaesthetic. There was not only complete loss of skin sensation but of the underlying peritoneum also. A 12-inch vertical incision was made in the sublumbar fossa. In two cases the abomasum was seen immediately the peritoneum was incised. In one case the abomasum was more anterior and lying under the ribs, while in the fourth case it was lying ventral to the lower end of the incision. In each case it was possible to demonstrate the position of the abomasum by exposing it through the abdominal incision. Although the displaced organ was empty in each of the four cases and was not distended with gas, attempts to replace the organ by pressing it downwards were unsatisfactory; for even when the abomasum was pushed below the rumen it tended to return with the hand as the hand was withdrawn. By passing the left arm over the top of the rumen it was possible to reach the right ventral part of the rumen. When an assistant passed a right arm through the lower part of the same laparotomy incision and to the left of the rumen it was possible for the two operators' hands to meet, and each could pull the abomasum and recognise it. In spite of this procedure the abomasum could not be pulled sufficiently to the right of the rumen to leave the operator satisfied that it would not return to its displaced position again.

Method of Replacing Abomasum

The greatest hindrance to the complete transfer of the abomasum from the left to the right side of the rumen is the presence of the superficial greater omentum. This tissue is attached to the left longitudinal groove of the rumen and passes underneath the ventral sac of the rumen to be attached to the greater curvature of the abomasum (Fig. 1). In the normal animal this part of the greater omentum is obviously quite long enough to allow the abomasum to lie in the correct position. Nevertheless, its

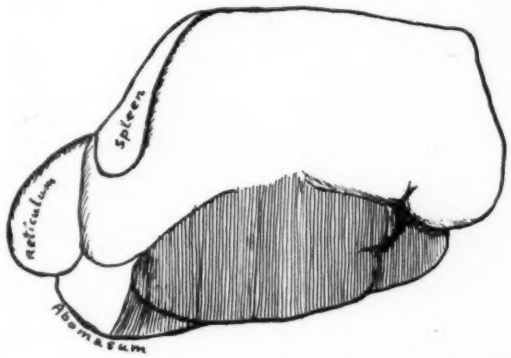

FIG. 1.—Shaded portion represents the superficial greater omentum.

presence only just allows the displaced abomasum to be pushed into the ventro-right lateral side of the rumen and no more, thus leaving the operator in doubt whether it will remain in this position. If, however, the omentum is torn from the longitudinal groove of the rumen, then the abomasum can be pushed under the rumen readily and can be lifted up on the right side until it can actually be viewed over the top of the rumen from the left side.

In order to avoid excessive haemorrhage the tearing of the omentum is made near to the rumen and not near to the abomasum. Even with this precaution some haemorrhage takes place into the peritoneal cavity, but there is no cause for alarm because the haemorrhage does not appear to continue for long and the presence of the blood does not appear to impede recovery of the animal.

After the omentum has been torn, a large pair of artery forceps or other forceps are clamped on to it near to the abomasum in order that this tissue can be recognised later. A hand is then passed over the top of the rumen, down its right side, and underneath it, until the forceps are recognised. Gentle traction on the forceps brings the omentum, and then the abomasum, into the grasp and the latter can be held firmly and lifted up as already described.

In two cases the writer brought the torn omentum over the top of the rumen and sutured it into the muscle wound on the left side of the body, but this procedure is now considered unnecessary. The laparotomy wound is closed in the usual way.

The four cows in which this method of operation was used all improved quickly. Two made dramatic recoveries, in that they had eaten very little since

(Concluded at foot of col. 1 overleaf)

* Xylocaine.

Ascaridia dissimilis Vigeuras, 1931, in British Turkeys

BY

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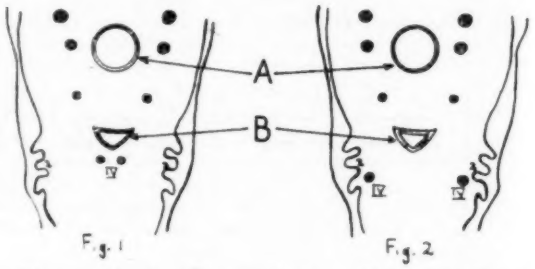
MAMMOTH bronze turkeys received in our diagnosis department by Mr. C. C. Wannop, M.R.C.V.S., were found to be heavily infested with *Ascaridia*. Since work on *Ascaridia galli* is in progress such infested birds are passed to us for the purpose of collecting ova from the gravid females.

The ascarids collected from these turkeys differed from *A. galli* in several respects. We were uncertain of the identity of these worms and submitted specimens to Dr. D. O. Morgan at Cambridge. Drs. Morgan and Soulsby kindly examined the worms and concluded that they were not *A. galli*. They thought that the species might be *A. dissimilis* and suggested that specimens be submitted for confirmation of identity to Dr. Everett E. Wehr of the Animal Disease and Parasite Research Branch of the U.S. Agricultural Research Service at Beltsville.

Wehr (1940, 1942) discussed the occurrence of *A. dissimilis* in turkeys in the United States and its life-history which, together with the original description by Vigeuras (1931) comprises, as far as we know, the only published references to this species. Dr. Wehr kindly examined the specimens we submitted and confirmed the view that the ascarids belonged to the species *Ascaridia dissimilis* Vigeuras, 1931.

In a letter to the senior author Dr. Wehr stated that *A. dissimilis*, rather than *A. galli*, is the predominant species in turkeys in the vicinity of Washington, D.C.

According to Wehr, *A. dissimilis* is usually smaller than *A. galli*; our measurements of the lengths of adult worms ranged from 37 to 45 mm. in the males and from 53 to 70 mm. in the females. Wehr also states that *A. dissimilis* is readily differentiated from *A. galli* by the more median position of the fourth pair of ventral papillae of the male. In *A. galli* the papillae are widely separated, each being situated just behind and slightly internal to the second pair of lateral papillae. In *A. dissimilis* the fourth pair of ventral papillae are closely approximated and are situated near the median line just posterior to the anal opening (Wehr, 1940). The positions of the fourth pair of ventral papillae of both species are roughly shown in our diagrams (Figs. 1 and 2). These diagrams do not pretend to show accurate morphological detail but merely illustrate the approximate positions of the fourth ventral papillae in these species.



Diagrams showing the approximate positions of the fourth ventral papillae and their relationship to the second lateral papillae and cloaca in the males of :

Fig. 1. *Ascaridia dissimilis* Fig. 2. *Ascaridia galli*
A = sucker, B = cloaca.

Wehr believes that the life-cycle is similar to that of *A. galli* and that two months or longer are required for the worms to mature in the host. We have found little difference between the structure or dimensions of the ova of these species. Preliminary tests have shown that the ova embryonate in 9 or 10 days at a temperature of 30° C. Wehr reported that ova suspended in tap-water at room temperature required 14 days to embryonate.

In a preliminary trial we failed to infect hen chickens with embryonated ova of *A. dissimilis*. We administered ova to hen chickens after 10 and 15 days' incubation. Chickens were killed and the intestines digested on the 13th, 18th, and 19th days of the infection and no larvae were recovered. Fifteen three-week-old chickens were also fed 100 embryonated ova each (these ova had been incubated for 19 days) and were killed 46 days later. The intestines were searched and no worms were found. One bird of the same age was given 100 embryonated ova of *A. galli* at the same time and was also killed 46 days later when a substantial number of worms was found in the intestine. Parallel infection trials will be made with *A. dissimilis* in chickens and turkeys to determine the existence or not of a true host-specificity.

So far as we can ascertain, *A. dissimilis* has not previously been recorded in Britain. Although we have no grounds for suspecting that *A. dissimilis* is the predominant ascarid species in turkeys in this country it is possible that all ascarids hitherto recovered from turkeys have been assumed, incorrectly, to be *A. galli*.

References

VIGEURAS. (1931). Nota sobre algunos helmintos de *Meleagris gallopavo*, encontrados en Cuba, con descripcion de una nueva especie. (2) pp., 1 pl. figs. 1-3, Habana. Quoted by Wehr (1942).

WEHR, E. E. (1940). *J. Parasit.* **26.** 373.

———. (1942). *Proc. helminth. Soc. Wash.* **9.** 73.

A Method of Correcting the Displaced Bovine Abomasum.—*Concluded.*

calving several weeks previously, but within 18 hours of operation they showed a hearty appetite, quickly came back to milk, and regained lost weight.

The method of operation has the following advantages:—

One laparotomy incision only is required.

The operation can be performed single-handed.

The abomasum can be left well to the right of the rumen.

References

ARTHUR, G. H. (1956). *Vet. Rec.* **68.** 254.

WOOD, C. (1957). *Ibid.* **69.** 91.

The Victoria Veterinary Benevolent Fund

A meeting of the Council of the Victoria Veterinary Benevolent Fund was held at 10 Red Lion Square, on February 11th, when the following members were present:—

Mr. H. W. Dawes (President) in the chair, Professor T. J. Bosworth, Mr. E. Clark, Major J. J. Dunlop, Mrs. D. I. Glover, Dr. E. Glover, Prof. J. McCunn, Mrs. B. Pugh, Messrs. J. N. Ritchie, and Arnold Spicer, Capt. W. Watt and Major W. H. Wortley.

In attendance, Mr. R. V. Thatcher, Solicitor, and Mr. C. W. Francis, Secretary.

Minutes

The Minutes of the previous meeting held on October 17th, 1956, having been printed in THE VETERINARY RECORD were taken as read and signed as correct.

Obituary

The Secretary reported with much regret the death of Mr. G. P. Male, O.B.E., M.R.C.V.S., Vice-President of the Council, which took place on November 29th, 1956.

The President, after referring to the immense interest which Mr. Male had shown in the work of the Council over a period of 26 years (he was for 23 years a Vice-President), and to his wonderful generosity to the Fund, said that his passing would be deeply felt by his colleagues on the Council. It was proposed from the chair that an expression of the Council's deepest sympathy in their great loss be conveyed to Mrs. G. P. Male and her family.

This was carried in silence, all the members standing.

Apologies for Absence

The Secretary reported apologies for absence from: Capt. G. Atkinson, Messrs. J. A. Flynn, G. N. Gould, Prof. R. Lovell, Capt. W. R. McKinna, Prof. W. M. Mitchell, Mr. G. M. G. Oliver, Miss V. Tillemont-Thomason, Miss O. Uvarov, Prof. W. L. Weipers, Capt. A. Whicher, and Dr. W. R. Wooldridge.

Correspondence

(a) The President reported that he had received a letter from Messrs. Brain & Brain, Solicitors, Reading, conveying the news that Mr. G. P. Male had made provision in his will for the Fund to receive the sum of £1,000, free of duty, and that this would be sent to the Secretary in due course. This generous gift would be greatly appreciated, expressing as it did, the great sympathy of the late Mr. Male in the work carried out by the Fund.

(b) A letter was read from the Secretary, British Veterinary Association, enclosing cheque for £107 18s. 10d., being half-share of the profits from the B.V.A. Personal Accident and Sickness Insurance Scheme.

It was resolved that the warm thanks of this Council be conveyed to the Members of the B.V.A. Council for their generous decision in making this donation to the Fund.

(c) The Secretary read a letter from Mr. J. A. Flynn, Hon. Treasurer of the Veterinary Medical Association of Ireland enclosing cheque for the sum of £311 15s. 8d. which had been collected for the Fund, the amount being made up of (a) Ordinary subscriptions, (b) Life Membership subscriptions, (c) Subscription by Medical Exhibitors Association, (d) proceeds of a dance, (e) proceeds of film show, (f) contributions by the Students' Union.

It was unanimously resolved that a special letter be sent to Mr. J. A. Flynn expressing the Council's thanks and appreciation for this generous contribution to the Fund.

(d) The following Nominations to Council were received:—

(i) Mid West Veterinary Association—Professor A. Messervy, M.R.C.V.S. in the place of Professor C. W. Ottaway, PH.D., F.R.C.V.S.

(ii) South-East Midlands Veterinary Medical Association Capt. A. A. Lamont, B.SC., M.R.C.V.S.

(e) *Legacies.* Letters were received from

(i) Messrs. J. D. & N. D. Walker, Solicitors, enclosing cheque for the sum of £50 left to the Fund by the late Mr. Harry Stephenson Elphick of Newcastle-on-Tyne.

(ii) Messrs. Edmonds and Ledingham, Solicitors, stating that the late Mr. Duncan Cumming, Aberdeen, had under his will bequeathed to the Fund the sum of £50.

Investments

The Treasurer reported that he had arranged for the balance standing in the Donations Account at the end of December 1956, amounting to £467, to be invested in the purchase of £631 0s. 3d. Funding Stock, 3½ per cent. 1999/2004.

It was resolved that the Treasurer's action be approved.

Accountant's Report

The Secretary submitted the following report which was approved, a vote of thanks being accorded to the respective donors:—

Since the previous meeting of Council the following special subscriptions, donations, and legacy have been received:—

	£ s. d.	£ s. d.
Legacy		
Elphick, H. S. (Darlington) ...		50 0 0
Subscriptions		
McCallum, A. M.	10 0 0	
	10 0 0	
		20 0 0

	£ s. d.	£ s. d.
Donations		
Member's B.B.C. fee	7 7 0	
B.V.A. share of profits on insurance scheme	107 18 10	
Evans, D. A. "In memory of Mrs. Rosemary Spence" ...	3 3 0	
Frost, H.	3 3 0	
Highland Canine Association ...	1 0 0	
Hillman, R. W.	1 10 0	
Ladies' Kennel Association 5 5 0		
5 5 0		
	10 10 0	
Richmond Dog Show	7 7 0	
Royal (Dick) School Dramatic Society	20 0 0	
Royal Veterinary College December graduates (per Professor Formston)	3 10 0	
Smith, Mr. and Mrs. H. Williams	4 0 0	
Wellingborough and District Canine Society	2 2 0	
Whicher, A.	10 6	
		172 1 4
Collecting Boxes		
Anonymous	7 7 3	
Ayrshire V.A.	1 8 0	
Brancker, Miss W. M.	1 14 0	
Bruford, J. W.	1 5 0	
Central Veterinary Society 4 13 0		
4 16 11		
	9 9 11	
Chambers, Franklin & Chambers	1 15 0	
Eastern Counties Veterinary Society	6 0 0	
Gould, G. N.	2 6 6	
Hewer, Spriggs & Wilson	2 12 6	
Hopson, C. G.	3 10 0	
Lincs and District Division ...	5 1 0	
Midland Counties V.M.A. ...	3 6 6	
Mid-West Veterinary Association	7 13 6	
Morton, J. T.	1 6 6	
North of England V.M.A. ...	6 2 4	
North Wales Division	3 17 4	
Pasfield, J. A.	1 7 6	
Royal Counties Division	11 11 0	
Russell, Miss E. E. B.	2 7 6	
Scottish Branch	1 13 6	
Scottish Metropolitan Division	2 13 7	
Scottish Regional Group, Association of Veterinary Teachers and Research Workers	2 2 0	
South East Midlands V.M.A. ...	4 8 6	
South Eastern Veterinary Association	9 0 0	
Shipley & Son	12 6	
Sussex Veterinary Society ...	6 0 0	
Welsh Branch	2 0 1	
Western Counties Veterinary Association	5 13 5	
Wortley, W. H.	1 5 4	
Yorks V.M.A.	14 10 0	
		130 0 3
Combined Subscriptions and Donations		
Veterinary Medical Association of Ireland		311 15 8
		£683 17 3

Christmas Gifts

The Secretary reported that Christmas gifts amounting to £299 were forwarded to 36 recipients on December 17th, 1956.

It was resolved that the action of the Executive Committee in sending out special gifts in December last to 36 recipients of the Fund at a total cost of £299, as detailed in the list submitted to the meeting, be and is hereby confirmed.

Garnett Annuity

The Secretary reported with regret that the Garnett Annuitant, died on November 27th, 1956. In view of the financial circumstances of the widow, the Executive Committee acceded to her request that she be allowed to receive the half-year's payment of £8 15s. 9d. due on December 1st towards the funeral expenses. It was agreed that the action of the Executive Committee be confirmed.

Cases

No. 275, widow, aged 51, two sons, aged 22 and 19. The Secretary reported that this case had been placed on the agenda in accordance with the instructions given at the meeting of Council held on April 13th, 1956. After discussion, it was agreed that a member of the Ladies' Guild be asked to visit this recipient and that any action on her report be left in the hands of the Executive Committee.

No. 276, widow, aged 42, one daughter, aged seven. Application received for assistance towards the child's education. *It was resolved* that the Secretary be instructed to contact a local member of the Ladies' Guild with a view to a visit being made to the applicant, and subject to a satisfactory report the Executive Committee be empowered to take such action as they consider desirable, and report to the next meeting of Council.

No. 300, widow, aged 89. Crippled with osteo-arthritis. Recently underwent a serious operation. The Secretary reported that a local member had kindly undertaken to visit her from time to time on behalf of the Fund and provide her with gifts in kind.

No. 301, M.R.C.V.S., aged 58. The Secretary reported the death of this member which took place in hospital on January 23rd, 1957, following an emergency operation. *It was resolved* that the grant of £4 per week be continued to the widow until the April meeting, when the case be further reviewed.

No. 312, M.R.C.V.S., aged 67. The President reported that, as requested, at the previous meeting he had written to a local member, and having regard to his reply, which was read, it was agreed that no action be taken in this case for the time being.

No. 315, M.R.C.V.S., aged 86. Crippled with arthritis. A report from a member of Council following his visit to this recipient was submitted and after consideration *it was resolved* that no alteration be made in the present grant of 9s. 6d. per week.

No. 316, widow, aged 49. Husband died on July 13th, 1956. Daughter, aged 18. Consideration of this case deferred at the last meeting.

A report from a member following his visit on January 17th, 1957, having been read, the Secretary was instructed as to the action to be taken in this case.

No. 318, widow. Boroughbridge, Yorks. The President reported the receipt of an application from this widow but as the N.V.B. and M.D. Society had expressed the desire to take over this case, he had instructed the secretary to forward the application to the Hon. Treasurer of the Society, and to express on behalf of the Council its appreciation and thanks for their kind assistance.

No. 243, widow, aged 50, three children. In view of the change in her financial circumstances which had come to the knowledge of the Council, *it was resolved* that this recipient be informed that the grant from the Fund will be discontinued after the March payment.

No. 245, widow, aged 72. The President submitted to the meeting a letter he had received recently from this recipient in which she enquired if her grant of £2 per week, her only income, could be increased because of the increased cost of living.

It was agreed that this lady should be visited by a local member of the profession, to be arranged by the President, and that his report be referred to the Executive Committee.

No. 317, son of late M.R.C.V.S., aged 60. Married. Defective eye-sight. Application for temporary assistance. After considerable discussion, it was agreed that the Executive Committee be empowered to act after the receipt of further particulars.

Wortley Axe Bequest

The special sub-committee appointed at the previous meeting of Council submitted the following interim report:—

Since its appointment, your sub-committee has held two meetings, the first taking place on December 13th, 1956, to consider the procedure to be adopted for carrying into effect Resolution (a) passed by Council at its meeting on October 17th, 1956.

After prolonged discussion, it was agreed in the first instance an approach be made to the Charity Commission to receive a deputation, consisting of the President, Solicitor and Secretary, for the purpose of an " off the record " talk on the terms of the Wortley Axe Bequest.

An interview was accordingly arranged on Thursday, January 17th, 1957, and having regard to the report of the Delegates which was duly considered by your sub-committee at a meeting held earlier to-day (February 11th, 1957) it was decided:—

That a formal application be made to the Charity Commission setting out the grounds upon which the Council considers it impracticable of carrying out the terms of the Wortley Axe Bequest, and their proposals as to how the Fund should be administered under a new scheme.

It was agreed that the report of the special sub-committee be received.

Staff Salaries

It was unanimously resolved that the salaries of the secretary and the accountant be increased by £80 and £20 respectively, as from January 1st, 1957.

Review of Cases

It was agreed that in future all cases receiving assistance should be reviewed by Council at least every two years.

Date of Next Meeting

The date of the next meeting, to be held in April, was left in the hands of the Executive Officers.

News and Comment

VETERINARY APPOINTMENTS IN AUSTRALIA

The B.V.A. has received a letter from a member suggesting that those who intend to apply for posts in Australia advertised in THE VETERINARY RECORD should first communicate with the Australian Veterinary Association if not fully acquainted with the conditions of the appointment and duties involved. This would accord with the advice given by the Australian Veterinary Association to its own members.

The B.V.A. feels sure that the General Secretary of the Australian Veterinary Association, whose address is 53, Martin Place, Sydney, would, if communicated with by air-mail, furnish any further information requested by a member of the B.V.A., and with the least possible delay.

UNIVERSITY NEWS

London

B. Vet. Med. Veterinary Clinical Examination, March, 1957

PART I

Alexander, Patricia Joan; Annear, Michael William; Baber, John Brian; Ball, David Clifford; Beach, Leonard Simmonds; Bradley, Raymond; Castell, Michael John Hartley; Creek, Michael John; Farrow, Anthony Bernard; Fox, Gerald William; Jones, Brian; Keizer, Richard; Kirby, Brian; Lacey, David George; Lang, David Christopher; Marriott, David William; Morley, Arthur Frederick; Oliver, John Julian; O'Shea, Jeremy David; Oxenham, Michael; Pope, David Charles; Potter, Michael John; Prosser, Graham George; Roberts, Edward Elfyn; Robinson, John Clowes; Sayle, Bryan; Smith, George Alfred; Smith, Roderick John; Thrift, Ronald James; Toes, Michael Matthew; Trim, Peter Noel; Turnbull, Patrick Alwyn; Van Laun, Thomas; Vos, Paul; Wade, David William Howard; Wilkinson, Edwin; Winstanley, Eric William, and Wright, Jeremy Neil.

FIFTY YEARS AGO

Letter to THE VETERINARY RECORD, June 1st, 1907.

" The days of making money out of veterinary practice are, in my humble opinion, gone. . . . The practices are few and far between which can support a principal without he has £100 a year of private money, and what the profession will come to in another decade we can only surmise. We must all (principals and assistants) earnestly pray that the Omnipotent will give us day by day our daily bread."

A LINK WITH LISTER

" We wish him, all his professional colleagues throughout the world will wish him—nay, all civilised humanity will wish him—many happy returns of the day." This tribute to Lister, who had celebrated his 80th birthday on the previous Friday, was published in THE VETERINARY RECORD 50 years ago. It went on, " Lister's immortal life-work, his antiseptic method of operating and of healing wounds, constitutes the greatest advance which surgery has ever made."

The great scientist's birthday was commemorated again last week, when the Royal College of Surgeons formally opened the Nuffield College of Surgical Sciences. Lt.-Gen. the Lord Freyberg, V.C., performed the opening ceremony in the presence of Viscount

Nuffield, the Bishop of London, the Council of the Imperial Cancer Research Fund, and a number of other notable persons, including members of the profession.

The Nuffield College has been described as an " All Souls " of surgery. Although its formal opening was on Friday, it has in fact been in occupation since January 1st this year, and already 80 post-graduate students, from all parts of the world, are in residence.

SEXTUPLET LAMBS

A seven-year-old cross-Kerry Hill ewe, belonging to Mr. T. A. Statham, of Greenway Farm, Peterchurch, gave birth to six lambs last week-end. One lamb died the same day, another lived for three days, and the remaining four are thriving. The lambs are by a Clun Forest ram which was one of triplets.

PROPOSED VETERINARY COLLEGE FOR WALES

The Council of the Royal Welsh Agricultural Society at Aberystwyth on Friday decided to urge the University of Wales to continue their efforts to obtain a veterinary college for Wales. A report was received on agricultural and veterinary education, and the Council discussed agricultural research and the services which the Society could render to the Welsh farmer.

PERSONAL

Births

ASHFORD.—On March 27th, 1957, to Angela, wife of Arthur O. Ashford, M.R.C.V.S., of East Grinstead, Sussex, a daughter, Jane Linden.

BARNES.—On March 24th, 1957, to Kathleen, wife of Joseph Barnes, M.R.C.V.S., of Homecroft, Station Hill, Wigton, a son, Douglas Grant, brother for Susan.

CASTLE.—On March 15th, 1957, at Irvine, Ayrshire, to Elizabeth Joy (*née* Bailey), M.R.C.V.S., and Malcolm E. Castle, a son, Jeremy Leo.

WATKINSON.—On March 24th, 1957, to Jessie, wife of Jack Watkinson, B.V.M.S., M.R.C.V.S., of 37, Warren Street, Dewsbury, Yorks, a daughter, Helen Sarah.

R.C.V.S. OBITUARY

We record with regret the deaths of the following members of the profession:—

FRASER, Nairn, Meadow View, Hempnall, Norwich, Capt. late R.A.V.C. Graduated New Edinburgh, December 20th, 1892; died March 29th, 1957, aged 85 years.

STARKEY, Dickinson (O.B.E., late Captain R.A.V.C.), of 126, Newport Road, Middlesbrough. Graduated Edinburgh, July 11th, 1914; died April 3rd, 1957.

COMING EVENTS

April

17th (Wed.). Meeting of the Section of Comparative Medicine, Royal Society of Medicine, at the Society's House, 5 p.m.

20th (Sat.). Annual Dinner of the R.V.C. '52 Club at Ye Miller of Mansfield, Goring.

Meeting of the Scottish Group of the Nutrition Society in Aberdeen for a Symposium on Clean Food.

27th (Sat.). Annual General Meeting of the Association of State Veterinary Officers in the auditorium of the Wellcome Research Institution, 183-193, Euston Road, London, N.W.1, 4 p.m. The Annual Dinner will be held at the Café Royal, 6.30 p.m.

May

1st (Wed.). Meeting of the Southern Counties Veterinary Society at the Royal Hotel, Winchester, 7.30 p.m.

2nd (Thurs.). Annual General Meeting of the Society of Practising Veterinary Surgeons at the Grand Hotel, Birmingham, 2.30 p.m.

Annual General Meeting of the Central Veterinary Society at the Royal Veterinary College, Camden Town, N.W.1, 6 p.m.

3rd (Fri.). General Meeting of the Yorkshire Veterinary Society at the Royal Station Hotel, York, 2.30 p.m.

Meeting of the Mid-West Veterinary Association at the University of Bristol's Veterinary School, Langford House, Langford, 2.15 p.m.

8th (Wed.). UFAW Symposium on " Human Technique in the Laboratory " in the Harkness Hall, Birkbeck College, Malet Street, London, W.C.1, 9.45 a.m.

Fifteenth Annual General Meeting of the Society of Women Veterinary Surgeons at Glaxo Laboratories, Ltd., Greenford, Middlesex, 11.30 a.m.

9th (Thurs.). Annual General Meeting of the Essex Veterinary Society at the Essex Institute of Agriculture, Writtle, Nr. Chelmsford, 7.30 p.m.

17th (Fri.). Meeting of the R.A.V.C. Division at the National Institute for Research in Dairying, Shinfield, Reading, 11 a.m.

24th (Fri.). 165th Annual Ball of the Royal Veterinary College Students' Union Society at the Royal Veterinary College, Camden Town, N.W.1, 9 p.m.

June

13th (Thurs.). Annual Dinner of the R.A.V.C. Officers' Club at the Grosvenor House, Park Lane, London, W.1.

FOOT-AND-MOUTH DISEASE

The area described in the Schedule below shall cease to be an Infected Area for the purpose of preventing the spread of foot-and-mouth disease on April 15th, 1957:—

IN THE COUNTY OF KENT

The Boroughs of Dover and Folkestone.

In the Petty Sessional Division of Hythe and Romney Marsh: The parish of Hawkinge.

In the Petty Sessional Division of Wingham and Sandwich: The parishes of Wootton, Swingfield, Sibertswold, Lydden, Alkham, Capel-le-Ferne, Hougham Without, Temple Ewell, River, Coldred, Whitfield, West Langdon, East Langdon, Guston and St. Margaret's at Cliffe and so much of the parish of Tilmanstone as lies to the south of the road running from Eythorne to West Langdon excluding the said road.

The area described in the schedule below shall cease to be an Infected Area for the purpose of preventing the spread of foot-and-mouth disease on April 19th, 1957:—

The County Borough of Hastings.

IN THE COUNTY OF EAST SUSSEX

The Borough of Bexhill.

In the Petty Sessional Division of Battle: The parishes of Mountfield, Whatlington, Sedlescombe, Penhurst, Battle, Westfield, Catsfield, Ninfield, Crowhurst and Ore.

In the Petty Sessional Division of Rye: The parishes of Fairlight and Guestling and so much of the parish of Brede as lies to the south of the road running from Cripps Corner *via* Broad Oak to Udimore excluding the said road.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Ches. Lower Yew Tree Farm, Birtles Lane, Over Alderley, Macclesfield (Mar. 29); Lower Yew Tree Farm, Over Alderley, Macclesfield (Apr. 3).

Derby. Badger Green Farm, Church Broughton (Apr. 2).

Flints. Old Marsh Farm, Sealand (Apr. 1).

Hants. New Barn Farm, Harcombe Estate, Ropley (Apr. 4).

Herts. Parsonage Farm, Sawbridgeworth (Apr. 2).

Hunts. Hill Farm, Catworth (Mar. 30).

Kinross. Holton Farm, Milnahort (Mar. 29).

Leics. Harcourt Farm, Kibworth Harcourt (Apr. 2); Abbotts Oak Farm, Greenhill, Coalville (Apr. 3).

Northants. Bell Hill Farm, Finedon, Wellingborough (Mar. 30); Wollaston Lodge Farm, Wollaston, Wellingborough (Apr. 1); Broadholme Farm, Irthlingborough, Wellingborough (Apr. 2).

Renfrew. Laigh Craiglinscheoch Farm, Kilmacolm (Mar. 29).

Salop. Astley Grange Farm, Hadnall, Shrewsbury (Apr. 2).

Somerset. Walk Farm, Witham Friary, Frome (Apr. 4).

Stirling. Easterton Farm, Milngavie, Glasgow (Apr. 1).

Warwicks. Brierley Farm, Brinklow, Rugby (Apr. 1).

Westmorland. Underley Grange, Kirkby Lonsdale, Carnforth (Mar. 29).

Fowl Pest

Essex. Stoke Priory, Stoke-by-Nayland, Colchester (Mar. 31).

Lancs. Sunnydene, Hall Carr Lane, Longton (Apr. 1); Bank Hall Farm, Bretherton; Lonsdale, Liverpool Old Road, Longton (Apr. 2).

Swine Fever

Bucks. Laurels Farm, Preston Bissett (Apr. 3); Bowstridge Farm, Bowstridge Lane, Chalfont St. Giles (Apr. 4); Little London Green, Oakley, Aylesbury (Apr. 5).

Glamorgan. Rear of Rumney Welding Co., Wentloog Road, Rumney, Cardiff (Apr. 5).

Hants. Piggeries at 1043 and 1045, Ringwood Road, West Howe, Bournemouth (Apr. 4); Princes Bridge Cottage, Liss (Apr. 5).

Middx. Hall Farm, Dennis Lane, Stanmore (Apr. 2).

Warwicks. Public Slaughter Hall, City Meat Market, Birmingham, 5 (Apr. 3).

Worcs. Woodlands, Coopers Hill, Alvechurch (Apr. 3).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Abortion in the Mare Associated with Torsion of the Umbilical Cord

Sir,—Whilst seeing practice recently, I attended a case of a nine-year-old hunter mare which had slipped her foal overnight when approximately nine months pregnant. The aborted foetus was contained in the foetal membranes including the intact placenta.

On opening the membranes, which showed some evidence of putrefaction, there was found to be excessive torsion of the umbilical cord, in corkscrew fashion, which had evidently cut off the foetal blood supply resulting in death of the foetus.

The history given by the owner indicated symptoms of mild colic two days previously, as the mare had been seen to roll rather frequently. Whether the symptoms of rolling gave rise to the torsion, or whether they were in fact efforts on the mare's part to expel the foetus is difficult to determine.

I should be interested to hear of any similar cases.

Yours faithfully,

N. R. F. LITTLE.
(Student)

Royal Veterinary College,
London.

April 2nd, 1957.

Agreements between Principals and Assistants

Sir—You published in your issue of February 23rd an editorial, and a model agreement as between principals and assistants together with recommendations. I wonder how many assistant veterinary surgeons took any part in the discussions which led to the drawing up of a model agreement? In the first paragraph of the explanatory notes it is said that although the agreement in large measure protects the interests of the principal of a practice, it should be considered as a bond for mutual benefit. One cannot help feeling that in the model agreement the protection of the principal seems to play a considerably more important part than the protection of the assistant. May I comment upon some of the clauses of the agreement?

What is meant, for example, by " lawful " directions? Must an assistant always give way to the principal where there is a difference of opinion? I would suggest that the words " lawful directions " need to be defined. Clause 3 (f) which states that the assistant must make no change of residence without the consent of the principal is surely exacting. Cannot the assistant be allowed to choose his own lodging?

In cases where accommodation and ancillary services are provided would it not be reasonable to say clearly that these must be of a kind acceptable to the assistant? I believe it is true that there have been occasions when such accommodation, especially that offered to married assistants, has been open to considerable criticism.

Clause 3 (g) would appear to prohibit the assistant from doing minor acts of kindness, such as giving advice gratuitously to old-age pensioners or to children who own pet animals. I venture to doubt whether any principal would object to such things being done.

Clause 5, which deals with use of the principal's car, requires that the assistant shall keep it in good running order; but it is not required that the principal shall provide a sound road-worthy vehicle to begin with. I do not suggest that the principal would not do so, but surely there should be a *quid pro quo* here? Similarly, the clause regarding illness seems rather hard. Taken at its face value it means that such an accident as a broken leg might bring about the termination of the assistant's employment; if a similar accident incapacitated the principal it is presumed that any loyal assistant would carry on the practice, or his share of it, for whatever time the principal was away.

Clause 9 (d) seems to preclude an assistant from competing with his principal for a public appointment. To do such a thing may be ethically debatable, but it means in effect that any given public appointment would not necessarily be awarded on merit.

I have no doubt, Sir, that those who gave up their time and thought to drafting this model agreement did so with the intention of performing a service to their profession; but while one may be grateful, one does feel that the result of their labours could be construed as being somewhat one-sided to the assistant's disadvantage.

H. D. CORYN.

"Moorcroft,"
Elm Tree Avenue,
Frinton-on-Sea.

April 2nd, 1957.

Bovine Obstetrics

Sir,—I should like to congratulate Mr. Straiton on his stimulating article. His approach is certainly very interesting, but leaving a heifer nearly three days in labour is extraordinary and must leave the animal very exhausted. He does not make it clear how frequently he examines the animal while he is waiting, or how long he considers it safe to leave a calving after rupture of the amnion. It seems to me unnecessary to delay for long after the appearance of the calf's nose, particularly (as he states) as the head may become markedly swollen. I am certain that no harm can be done at this stage by gentle traction whilst the calf is still adequately lubricated by amniotic fluid.

Mr. Straiton should now write a treatise on the education of clients, which is one of the main stumbling blocks in the application of his methods. One of the first things the average farmer does, on examining a calving cow, is to break the water bag, after which delay for 12 hours would be dangerous. The dry calving is the one to be avoided at all costs.

With regard to ring womb in the ewe, I have recently operated on four ewes for this condition. In two cases I delayed operating for 24 and 36 hours in the hope that the cervix would relax, and in both cases the lambs were very sluggish and the navel cords were thick and had to be ligated and cut. None of the lambs survived. One lived for 48 hours, but mostly they died within an hour or two. In the other two instances I operated on the same day and the lambs were noticeably more active, the navel cords were normal and ruptured spontaneously. Three out of five of these are still living (after three weeks) and all the ewes are doing well. One other case, that I left longer, had a less happy ending. The ewe died suddenly on the third day, the lambs being putrid. I consider that this condition is the main indication for the caesarean operation in the ewe, and where milk is present should be done as soon as a diagnosis can be made. If the ewe has no milk there might be a case for delaying for 12 to 24 hours.

Three of the five cases mentioned had previously prolapsed the cervix. Is there any connexion between the two conditions?

Yours faithfully,

R. T. PEPPER.

Inglenook,
Mill Lane,
Barcombe, Sussex.

April 1st, 1957.

Sir,—My first reaction to reading this article was that it was written in jest, but I have now reluctantly decided that it is a serious dissertation.

Having read lately that it is difficult to get articles published as the scrutineers are very critical, it is difficult to comprehend how this one got by. It would surely have been more suitably placed in the correspondence column, being nothing more than an expression of personal opinion without headings, details or references. We have seen correspondence of late to the effect that THE RECORD needs brightening up but such brightness as this I had not visualised. It does not seem to be suitable to the columns of our journal, simple minded though the author may take some of us to be.

Is Mr. Straiton serious in saying that he "practised widely" the operation of caesarean section in 1947? And his statement that losses from dystocia outnumber those from any other single disease should not be left unchallenged. Without recourse to knacker statistics it would be hard to place losses in order of importance, but many more cattle die from Johne's disease, and summer mastitis (to mention only two) than from dystocia; at least they do in this practice. I find it hardly credible that a farmer possessing 36 attested pedigree Friesians would kill nine in succession without seeking advice long before such a state of affairs could come about.

We lesser mortals of the profession are next told how we should cope with a relatively oversized foetus,

and then only in the vaguest of terms. Gad, Sir, these things are not uncommon even outside Stafford, and in other Friesians. We are further treated to a beginner's course on malpresentation. To my more experienced colleagues in the profession this would seem to add insult to injury!

Finally, we are told that ring womb in ewes does not exist. This, again, is discussed in the vaguest of terms. Perhaps Mr. Straiton is calling our attention to those ewes presented to us in the first stages of labour by the over-anxious farmer, which, given time, will lamb normally. Or is he trying to tell us that these results were obtained from ewes when the amnion has been ruptured for several hours with an almost closed cervix? If so, once again it would be very difficult to agree with his opinion, having seen so many die.

May I suggest that when such revelations as these are to be published—showing all our fundamental knowledge of dystocia to be wrong—could we have a more scientific paper, with reasoned deductions and clinical evidence rather than verbal extravagances?

Yours faithfully,

J. B. WALSBY.

Silva House,
Midsomer Norton,
Bath.

April 1st, 1957.

Sir,—I wish to thank Mr. White and Dr. Fitzpatrick for their constructive criticism. The reason my publication appeared "belated" was simply because a number of years has been necessary to gain completely the confidence and co-operation of a large number of farming clients and to acquire sufficient conclusive evidence to enable me to write with some authority. Because of this long period of observation I am satisfied that my evidence is sound and therefore I do not think the case was overstated. However, I am delighted that Mr. White and Dr. Fitzpatrick have appreciated my main points.

I shall be greatly interested to follow Mr. White's experience in the Friesian herd he mentions. I personally disregard completely the rupture of the foetal membranes and adopt the human obstetrician's procedure (outlined by Dr. Fitzpatrick) of watching and waiting and refraining from manual interference so long as progress, *no matter how slight*, is being made as revealed by the physical signs, chiefly dilatation of the cervix. In all the cases of prolonged labour investigated, I examined the cervix at 12-hour intervals in the case of cows, and at 24-hour intervals in ewes for reasons of economy.

I shall be very grateful if Mr. White can further test my findings during his next lambing season, by leaving at least 50 per cent. of his "ring womb" cases alone: I personally do not think stilboestrol therapy is important or necessary, but I feel sure that patience and time will produce results that will impress Mr. White greatly. Before my series of experiments I, too, was convinced ring womb was an unavoidable pathological condition.

I regret now that I did not incorporate in my publication my many observations on the natural bovine birth, and at least a few more of the many cases which comprised my evidence. Perhaps I may just say, now, that during a prolonged labour a heifer or cow does not exhaust herself. She will labour for perhaps 15 to 30 minutes, then stand up, have a drink or feed, and then lie down again for another short period usually on the side opposite to that on which she previously laboured. Incessant labour does not supervene until either there is manual interference or until normal delivery is almost completed. In practically all the 12- to 72-hour labour cases observed, the patient's pulse, body temperature and general bearing towards the end of the labour were very similar to those of any bovine animal in the early stages of labour. This fact really impressed me.

In premature parturition cases I have often left both heifers and cows in labour for much longer than three days—sometimes as long as seven or eight days. In practically every case the foetus has been delivered without any exhaustion or apparent ill-effect on the patient.

It is interesting to record one case which is almost fantastic. A client who for several years has been practising with great success my technique of time and patience, actually left a Friesian heifer in labour for *three weeks*. Eventually she calved by herself and one of my partners gave a two-day preventative treatment against possible sepsis. The heifer was in amazingly good condition when he saw her and made a complete recovery.

My small-animal manager tells me he has left female cats in labour for a fortnight with perfectly satisfactory results.

I sincerely hope that the phenomenon of natural parturition in all animals will be further investigated by progressive thinkers like Mr. White and Dr. Fitzpatrick, and by our physiological research workers.

Yours faithfully,

E. C. STRAITON.

132, Lichfield Road,
Stafford.

April 8th, 1957.

Sedation with Chlorpromazine in the Horse

Sir,—I read the article contributed by Messrs. L. N. Owen and P. A. Neal with great interest, having played some part in the introduction of chlorpromazine to veterinary therapeutics and practice. When the original joint article, Troughton, Gould & Anderson (1955), was written my own experience with chlorpromazine in equine practice was very limited, but even at that stage my experience suggested that its use was as a tranquilliser rather than as a narcotic—with a very important place as a pre-anaesthetic aid to safer anaesthesia.

The question of dosage of new products is always a difficulty—particularly where side effects of an undesirable character can occur with dosage above certain levels, and the tendency to expect too much from modern chemotherapeutics is possibly natural.

It would seem to me that anyone expecting to use chlorpromazine in equines for the deep sedation of the kind apparently expected by the authors of the article, without risk of undesirable side effects, is "crying for the moon."

If a powerful animal like the horse is to be injected with a cerebral depressant which is adequate to act as a hypnotic or narcotic, then it is fairly certain that constant effects will rarely be attained and that from time to time unpleasant behaviour will result.

It is my view that, if the horse is to be on its feet, the dose of whatever preparation is used to produce any degree of sedation must not be great enough for the patient to lose its sense of awareness, control, or response to management. The narcotised animal, without adequate control of its enormous muscular power, and with its mental power unbalanced, is a most difficult animal to control at any time. It is, therefore, in my opinion, bad practice to use chlorpromazine—or any other such preparation—as a hypnotic or narcotic.

Used as a tranquilliser or very mild hypnotic—which can be rightly claimed to be a degree of sedation—it is a most valuable adjunct to equine practice, permitting easier handling of difficult animals, reducing the nervous animal's sense of fear of those handling it, and providing more easily induced and safer anaesthesia when used as a pre-anaesthetic potentiator as well as a tranquilliser.

On one occasion only have I used a dose as great as 2.5 mg. per kg. by intramuscular injection in a hunter. Marked sedation followed in about 40 to 60 minutes, but the horse failed to respond to normal management, in that it walked forward ignoring the bridle, bit, and twitch, none of which had any restraining influence whatsoever. I concluded that the animal had been grossly overdosed.

I use chlorpromazine in horses in doses of 1 mg. per kg. intramuscularly as a tranquilliser in difficult subjects where there is to be some interference in the standing position requiring restraint or local anaesthesia. It facilitates such procedure and is really satisfactory for the purpose. It does not allow unusual handling without reasonable restraint or local anaesthesia.

I also use it as a pre-anaesthetic tranquilliser and anaesthetic potentiator in the same dosage: it facilitates the insertion of the intravenous needle, and makes the horse more tractable to handle in putting on hobbles ready to cast when the degree of narcosis induced by chloral-hydrate intravenously is adequate—particularly in a confined space. It enables anaesthesia to be maintained with a reduced amount of the anaesthetic compared to that which would be required without its use, and consequently there is less risk of toxic effects as a sequel, particularly in old animals. Recovery rate is rapid—usually less and certainly no greater than that using chloral alone—varying with the degree of anaesthesia at the time of completion of the operation performed.

For boxing horses for shipment and for aircraft travel it is extremely useful where difficulty arises, as it does from time to time, animals refusing to enter the box, particularly in the unusual environment of a dock shed or an airport.

Used as a tranquilliser, chlorpromazine can safely be used to advantage—the animal retaining full use of its limbs and still able to respond to normal management factors and restraint. In aircraft or on board ship such animals settle down well after the dosage mentioned. I have also found it of great value in spasmodic colic, in similar dosage, and use it nowadays as a routine.

In cattle I use it in the same dosage by intramuscular injection for the safer handling of difficult animals when interference is necessary or as a pre-anaesthetic potentiator when a general anaesthetic is to be used (very rare in these days). In bulls it is particularly valuable, in my experience. I have also found it to be of great value in cases of hypomagnesaemia as an adjunct to magnesium therapy in acute cases. Where the symptoms are very acute I usually give it immediately, and follow up with the magnesium injection in 5 to 10 minutes.

The field of use of this drug appears to be very wide in all branches of veterinary practice, but I am convinced that its use must be that of a tranquilliser and pre-anaesthetic potentiator and not that of a hypnotic or narcotic—at least in large animals.

Yours faithfully,

G. N. GOULD.

12, Landguard Road,
Southampton.

April 9th, 1957.

Reference

TROUGHTON, S. E., GOULD, G. N., & ANDERSON, J. A. (1955). *Vet. Rec.* **67.** 903.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-Mouth	Fowl Pest	Sheep Scab	Swine Fever
1st to 15th March, 1957		30	—	2	41	—	42
Corresponding period in	1956	183	1	4	23	—	19
	1955	41	—	1	8	—	48
	1954	16	—	2	49	—	58
1st January to 15th March, 1957 ...		102	2	13	232	—	181
Corresponding period in	1956	683	3	8	148	—	122
	1955	225	—	6	148	—	241
	1954	60	—	10	368	—	282